

What is claimed is:

1. A collapsible canopy frame comprising:

a plurality of side poles;

a plurality of scissor assemblies for coupling the
5 side poles to one another;

a center support pole comprising:

an outer pole having an upper end and a lower
end;

an inner pole slidable within the outer pole,
10 said inner pole having an upper end that can extend upwardly
from the outer pole and a lower end that can extend downwardly
from the outer pole;

a plurality of center scissor assemblies for coupling
the plurality of scissor assemblies to the center support pole;

15 a fixing bracket fixed to the lower end of the outer
pole, the fixing bracket comprising a central opening around the
inner pole and a side opening; and

a locking pin disposed at least partly in the side
opening of the fixing bracket, said locking pin for fixedly
20 coupling the inner pole to the fixing bracket.

2. The collapsible canopy frame of claim 1, wherein the
inner pole has a locking opening formed thereon near the lower
end for engagement with the locking pin.

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3. The collapsible canopy frame of claim 2, further
comprising:

a biasing member that engages the locking pin and
biases it towards the central opening, wherein the locking pin
30 engages the locking opening when the upper end of the inner pole
extends upwardly from the outer pole and the locking opening is
aligned with the locking pin.

4. The collapsible canopy frame of claim 1, wherein each of said scissor assemblies comprises a pair of ribs that are rotatably coupled to each other about a middle of each of said pair of ribs.

5. The collapsible canopy frame of claim 1, wherein there are four interconnected scissor assemblies between each pair of adjacent said side poles, which comprise two inner edge scissor assemblies and two outer edge scissor assemblies, wherein the two inner edge scissor assemblies are pivotably coupled to each other, and the two outer edge scissor assemblies are pivotably coupled to the respective said inner edge scissor assemblies and the respective said side poles.

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6. The collapsible canopy frame of claim 5, further comprising a plurality of upper connecting brackets and a plurality of lower connecting brackets, wherein the two inner edge scissor assemblies are pivotably coupled to each other via respective upper and lower connecting brackets.

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7. The collapsible canopy frame of claim 6, wherein two said center scissor assemblies are pivotably coupled between the upper and lower connecting brackets and the center support pole.

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8. The collapsible canopy frame of claim 7, further comprising an upper central hub slidably mounted on the outer pole and a lower central hub fixedly mounted at the lower end of the outer pole, each of the upper and lower central hubs comprising a plurality of connecting members in a general direction of the respective connecting brackets, wherein the inner scissor assemblies are pivotably coupled between

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respective said connecting members of the upper and lower central hubs and respective said upper and lower connecting brackets.

5 9. The collapsible canopy frame of claim 8, wherein the lower central hub is fixedly coupled to the fixing bracket.

10 10. The collapsible canopy frame of claim 1, wherein each said side pole is a telescoping side pole comprising a plurality of side pole sections.

15 11. The collapsible canopy frame of claim 10, wherein each said side pole comprises at least one another locking pin for locking at least two said side pole sections in an extended position.

20 12. The collapsible canopy frame of claim 10, wherein each said side pole comprises three telescoping side pole sections that can be locked in an extended position.

25 13. The collapsible canopy frame of claim 1, wherein the collapsible canopy frame in a collapsed state has the lower end of the inner pole extending downwardly from the outer pole.

30 14. The collapsible canopy frame of claim 1, wherein the collapsible canopy frame in an open state has the upper end of the inner pole extending upwardly from the outer pole.

35 15. The collapsible canopy frame of claim 1, wherein the biasing member comprises a spring.

16. The collapsible canopy frame of claim 1, further comprising a head member mounted on the upper end of the inner pole, wherein the head member is used to support a canopy cover at a center.

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17. A collapsible canopy frame comprising:

a plurality of telescoping side poles;

a plurality of scissor assemblies for coupling the side poles to one another, each scissor assembly comprising a pair of ribs that are rotatably coupled to each other;

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a center support pole comprising:

an outer pole having an upper end and a lower end;

an inner pole slidable within the outer pole, said inner pole having an upper end that is extendable upwardly from the outer pole and a lower end that is extendable downwardly from the outer pole, and having a locking opening formed thereon near the lower end;

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a plurality of center scissor assemblies for coupling

the plurality of scissor assemblies to the center support pole;

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a fixing bracket fixed to the lower end of the outer pole, the fixing bracket comprising a central opening around the inner pole and a side opening; and

a locking pin assembly disposed at least partly in the side opening of the fixing bracket, comprising:

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a locking pin; and

a biasing member that engages the locking pin and biases it towards the central opening, wherein the locking pin engages the locking opening when the upper end of the inner pole extends upwardly from the outer pole and the locking opening is aligned with the locking pin.

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18. The collapsible canopy frame of claim 17, wherein there are four interconnected scissor assemblies between each pair of adjacent said side poles, which comprise two inner edge scissor assemblies and two outer edge scissor assemblies, wherein the two inner edge scissor assemblies are pivotably coupled to each other, and the two outer edge scissor assemblies are pivotably coupled to the respective said inner edge scissor assemblies and the respective said side poles.

19. The collapsible canopy frame of claim 18, further comprising a plurality of upper connecting brackets and a plurality of lower connecting brackets, wherein the two inner edge scissor assemblies are pivotably coupled to each other via respective upper and lower connecting brackets.

20. The collapsible canopy frame of claim 19, wherein two said inner scissor assemblies are pivotably coupled between the upper and lower connecting brackets and the center support pole.

21. The collapsible canopy frame of claim 20, further comprising an upper central hub slidably mounted on the outer pole and a lower central hub fixedly mounted at the lower end of the outer pole, each of the upper and lower central hubs comprising a plurality of connecting members facing a general direction of the respective connecting brackets, wherein the center scissor assemblies are pivotably coupled between respective said connecting members of the upper and lower central hubs and respective said upper and lower connecting brackets.

22. The collapsible canopy frame of claim 21, wherein the lower central hub is fixedly coupled to the fixing bracket.

23. A collapsible canopy frame comprising:

a plurality of side poles;

5 a center support pole having an upper end and a lower end, wherein a head member for supporting a center of a canopy cover is attached at the upper end; and

a plurality of scissor assemblies for coupling the side poles to one another and to the center support pole, each scissor assembly comprising two ribs that are rotatably coupled
10 to each other, each rib having an upper end and a lower end and being oriented in a generally vertical direction when the canopy frame is in a collapsed state,

wherein the lower end of each rib moves upward by a first distance as the collapsed canopy frame in the collapsed
15 state is opened to an open state, such that the rib becomes oriented in a generally horizontal direction, and

wherein the head member of the collapsible canopy moves upward between the collapsed state and the open state by a second distance that is greater than the first distance.

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24. The collapsible canopy frame of claim 23, wherein the center support pole comprises:

an outer pole;

an inner pole slidable within the outer pole, said
25 inner pole having an upper end that can extend upwardly from the outer pole and a lower end that can extend downwardly from the outer pole, wherein the head member is attached at the upper end of the inner pole,

wherein the outer pole moves upward between the
30 collapsed state and the open state, and the inner pole moves upward with respect to the outer pole between the collapsed

state and the open state, such that the center pole is in an extended state.

25. The collapsible canopy frame of claim 24, further
5 comprising a locking pin for fixedly coupling the inner pole to the outer pole when the center support pole is in the extended state.

26. A collapsible canopy comprising:
10 a plurality of telescoping side poles (100);
a set (10) of edge scissor assemblies (200) between each of pairs of the side poles, each scissor assembly of said edge scissor assemblies having relatively rotatable ribs (200');
each said set of edge scissor assemblies comprising
15 outer scissor assemblies (200a) and inner scissor assemblies (200b),
a different first said rib of each of the outer scissor assemblies being pivotably affixed at an upper end of a different one of the side poles, the first ribs being pivotably
20 coupled together through upwardly extending pivoted ends (202b) of the ribs of the inner scissor assemblies,
a different second said rib of each of the outer scissor assemblies being pivotably connected to a bracket which is slidable along a different one of the side poles, the second
25 ribs being pivotably coupled through downwardly extending pivoted ends (202c) of the ribs of the inner scissor assemblies;
telescoping center pole assembly (300) having an outer pole (310) and an inner pole (320);
a set (12) of center scissor assemblies (201) for each
30 said set (10) of edge scissor assemblies, each said set of center scissor assemblies having relatively rotatable ribs (201'),

each said set of center scissor assemblies comprising
a third rib which is pivotably connected to a bracket
which is slidable along the center pole assembly and a fourth
rib which is pivotably coupled to the third rib and is pivotably
5 coupled to the upwardly extending pivoted ends (202b) of the
ribs in the corresponding set of edge scissor assemblies, and

a fifth rib which is pivotably connected to a lower
end of the outer pole and a sixth rib which is pivotably coupled
to the fifth rib and is pivotably coupled to the downwardly
10 extending pivoted ends (202c) of the ribs in the corresponding
set of edge scissor assemblies.